

WHAT IS CLAIMED IS:

1. A double feed detection method for detecting whether sheet materials are double fed or not, comprising the steps of:

5       applying an external force to a sheet material;  
      detecting a force obtained from the sheet material depending on the application of the external force, by a detector; and  
      determining whether the sheet materials are  
10   double fed or not based on a signal obtained from the detector.

2. The double feed detection method according to claim 1, wherein the external force is applied by  
15 bringing an external force application means into contact with the sheet material from a non-contact state between the external force application means and the sheet material.

20       3. The double feed detection method according to claim 1, wherein the external force is applied to the sheet material from a contact state between an external force application means and the sheet material.

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4. The double feed detection method according to claim 1, wherein when the external force is

applied, a distance between an external force application means and the detector changes.

5       5. The double feed detection method according to claim 1, wherein the external force is applied in a state where the sheet material is standing still.

10       6. The double feed detection method according to claim 1, wherein the external force is applied in a state where the sheet material is being conveyed.

15       7. The double feed detection method according to claim 1, wherein double feed is determined based on a voltage value of a voltage peak of a signal detected by the detector depending on the application of the external force.

20       8. The double feed detection method according to claim 1, wherein double feed is determined from frequency components of vibration detected by the detector depending on the application of the external force.

25       9. The double feed detection method according to claim 1, wherein when the external force is an impact applied by an impact applicator, double feed is determined from an interval between a plurality of

peaks of voltage generated from the detector by  
several times of recoil of the impact applicator.

10. The double feed detection method according  
5 to claim 1, wherein the external force is an impact.

11. The double feed detection method according  
to claim 1, wherein the external force is a vibration.

10 12. A double feed detection apparatus  
comprising:

external force application means for applying  
an external force to a sheet material; and

detection means for detecting a force obtained  
15 from the sheet material when said external force  
application means applies the external force to the  
sheet material.

13. An image forming apparatus comprising a  
20 double feed detection apparatus according to claim 12  
and an image forming unit.

14. An image reading apparatus comprising a  
double feed detection apparatus according to claim 12  
25 and an image reading unit.